STRESS EFFECTS ON NATURAL ECOSYSTEMS[1]

DONALD I. MOUNT, Director, Environmental Research Laboratory-Duluth, 6201 Congdon Boulevard, Duluth, MN 55804

OHIO J. SCI. 78(4): 175, 1978

To the lay public and even to many staff members of environmental protection agencies across the country, an ecosystem is a definable entity free of man's interference and activities and able to support itself through long periods of time without noticeable change. Obviously, nearly everything about that concept is erroneous. But today's ecologists must be keenly aware of this concept if they are to communicate effectively with decision-makers and with the public. Indeed, for the vast bulk of our land and water area, we no longer have the option of maintaining ecosystems in their natural state, except for selected places preserved for future study and other unforseen needs. The population of this country and of the world has reached proportions such that it is no longer possible for unmanaged ecosystems to provide enough food and fiber for the people of the world—not even for a mediocre standard of living well below that of the United States. Man's need for green belts and wilderness areas is even questionable, as evidenced by the manner in which he takes his civilized world with him when he goes into the wilderness to "rough it" pulling his "house" behind his car and taking his T.V., stereo, C.B., electric razor, trail bike, touring bike and motor boat with him.

For many years, this country and several other countries have been living on our energy bank account clearly using energy at a far greater pace than energy is being stored in presently usable forms whithin the bounds of the world. As man goes deeper and further into less rich sources to obtain energy, the net yield of energy decreases, and in some proposed technologies now approaches 1% net yield. Public attitude has made it clear that people are not interested nor willing to conserve energy except in trivial ways which cause no inconvenience or sacrifice to them.

If Confucius were alive today, he might well observe, "Man pays any price for alcohol, sex and gasoline." Man's efforts to acquire energy will do more to disrupt the world ecosystem than any other single activity.

Dollars may not be an adequate measure of acceptability for our future life styles, since everything requires, and nothing runs without, energy. Energy units may need to become the medium of exchange between people, societies and countries. A study of history and an observation of society today leaves little doubt that mankind must have a catastrophe before it is willing to do what must be done, if what must be done is inconvenient or constraining.

Ecologists of the past have ignored the need to convey to the public—those who ultimately pay for the research—the need for the work that they do. Too much of the work which has been done has been only a scientific curiosity to amuse those who do the research. Practical ecologists (those who are concerned with the provision of the necessary materials and conditions for the survival of the human race) have a super vital service to render to the world in a short time. First, they must convince the general public that there are indeed constraints on natural resources, and in the immediate time frame, especially for energy. Second, they must convince the lay public that man is forceful enough to destroy himself through changes in the atmosphere, the soil, and in other, as yet unidentified, ways.

These practical ecologists must determine the true needs of man, to enable man to thrive as a species for the next several hundreds of years. They must decide how

[1]Manuscript received July 25, 1977 and in revised form April 4, 1978 (#77-53).

much diversity of species is needed to produce the needed food and fiber with acceptable stability of populations and production. They must decide the living conditions which must exist in order for man to thrive as a species, and distinguish these needs from those things which are now thought to be essential and which really are not. They must decide man's requirement for wilderness areas and open spaces; what his space requirements are for an acceptable standard of living over generations. In other words we must know the ultimate carrying capacity of the earth for man.

Having done all of the above, it is then the practical ecologist's unenviable job to accomplish the nearly impossible—that is, to explain the trade-offs to the lay public in such a way that they can decide whether they want to go to the ultimate carrying capacity of the world, or stop at something less than the full carrying capacity and gain a higher standard of living. These practioners will not be heroes or knights in shining armor. They will be hated, despised and ignored as long as possible, but if they are unsuccessful and their conclusions are rejected—Society will get its comeuppance all too soon!